



Ventilator Associated Pneumonia

Chesley Richards, MD, MPH

Deputy Director

Division of Healthcare Quality Promotion

National Center for Infectious Disease

Centers for Disease Control and Prevention

SAFER • HEALTHIER • PEOPLE™



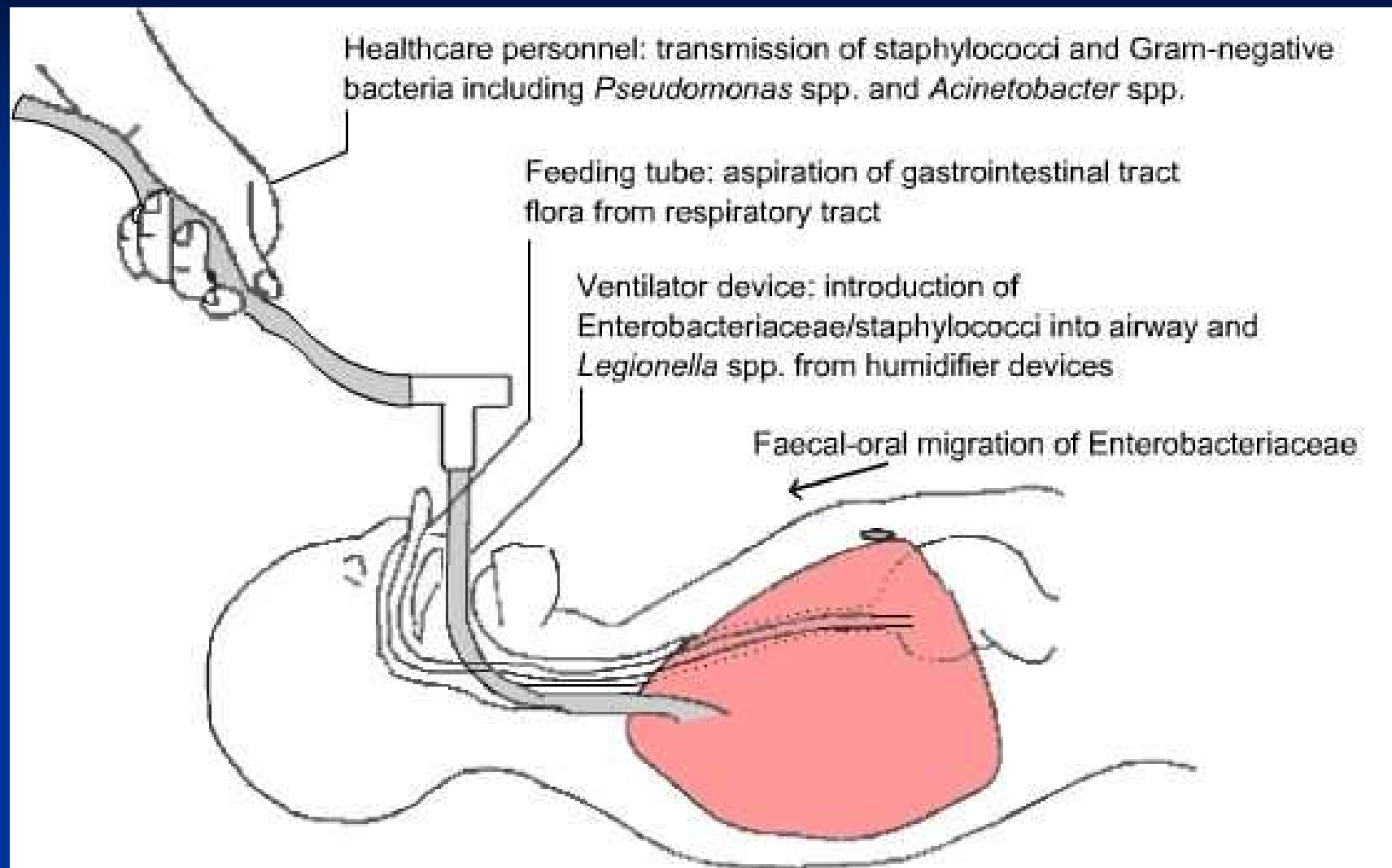
Healthcare associated pneumonia



HEALTHCARE
ASSOCIATED PNEUMONIA

Ventilator associated
pneumonia

SAFER • HEALTHIER • PEOPLE™



Estimated Annual Hospital Cost of HAI by Site of Infection

Major Site of Infection	Total infections	Hospital Cost per Infection (2002 \$)	Total annual hospital cost (in millions \$)	Deaths Per year
Surgical Site Infection	290,485	\$25,546	7,421	13,088
Central line associated-Bloodstream Infection	248,678	\$36,441	9,062	30,665
Ventilator-associated Pneumonia	250,205	\$9,969	2,494	35,967
Catheter associated-Urinary Tract Infection	561,667	\$1,006	565	8,205

Klevens RM, Edwards JR, Richards CL, Horan T, Gaynes R, Pollock D, Cardo D. Estimating healthcare-associated infections in U.S. hospitals, 2002. *Public Health Reviews* (in press)

Stone PW, Braccia D, Larson E. Systematic review of economic analysis of health care-associated infections. *Am J Infect Control* 2005;33:501-9.

Roberts RR, Scott RD, Cordell R, Solomon SL, Steele L, Kampe LM, Trick WE, Weinstein RA. The use of economic modeling to determine the hospital costs associated with nosocomial infections. *Clin Infect Dis* 2003;36:1424-32.

6/24/2010

Ventilator associated Pneumonia

- **Do prevention interventions exist?**
 - CDC/HICPAC, professional organizations
- **How effective are prevention interventions?**
 - Individual interventions recommended and have effects
 - Prevention impact less clear cut than with surgical site infection and bloodstream infection
 - Reasonably vary by patient population
 - Impact from bundles under study presently (Keystone)
- **Can we measure?**
 - VAP definitions difficult to apply and clinicians differ on diagnosis
 - Low likelihood that we can measure accurately using ICD 9/10 codes, even if present on admission variable in place

Pooled Means and Key Percentiles of the Distribution of Ventilator-associated Pneumonia (VAP) Rates, By Type of ICU, NHSN DA Module, 2006

VAP rate*			Percentile					
Type of ICU	No. of Units	Ventilator-Days	Pooled Mean	10%	25%	50% (median)	75%	90%
Burn	12	10,098	12.3					
Coronary	48	35,727	2.8	0.0	0.0	1.3	4.5	6.6
Cardiothoracic	48	46,710	5.7	0.0	1.4	4.0	8.1	19.4
Medical	64	109,277	3.1	0.0	0.9	2.8	4.6	7.2
Medical-Surgical								
Major teaching	58	84,530	3.6	0.0	1.3	2.5	5.1	7.3
All others	99	135,546	2.7	0.0	0.0	1.6	3.8	6.2
Pediatric Med-Surg	32	32,936	2.5	0.0	0.0	1.0	2.8	6.1
Neurosurgical	15	13,799	7.0					
Surgical	61	73,205	5.2	0.0	1.8	4.1	6.4	10.0
Trauma	19	32,297	10.2					

** $\frac{\text{Number of ventilator-associated pneumonia}}{\text{Number of ventilator-days}} \times 1000$

NHSN Report. AJIC 2007;35:290-310

Issues for Coding

■ Terminology

- Controversies regarding diagnosis
- Will ventilator-associated pneumonia be recorded?
- Pneumonia vs pneumonitis?
- Present on admission vs acquired in ICU

■ Resources

- HICPAC/CDC Guideline for the prevention of healthcare associated pneumonia
 - <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5303a1.htm>
- ATS/IDSA guideline
 - **Guidelines for the Management of Adults with Hospital-acquired, Ventilator-associated, and Healthcare-associated Pneumonia**

Comparison of terminology

ICD-9 Codes vs Surveillance events

Potentially Preventable Complication Groups*

CDC Surveillance Events

Pneumonia, Lung infection	→	Healthcare associated pneumonia
Aspiration pneumonia	→	Ventilator associated pneumonia
<i>Clostridium difficile</i> colitis	→	Clostridium difficile colitis
Urinary tract infection	→	Urinary tract infection (UTI)
		Catheter-associated UTI
Septicemia and Severe infection	→ [?]	Blood stream infection (BSI)
		Primary BSI
		Central line associated BSI
		Secondary BSI
Postop wound infection/Deep wound → disruption without procedure	→	Surgical site infection
Postop wound infection/deep wound disruption with procedure	↗	

*Hughes JS, et al. *Heal Care Fin Rev* 2006.

These groups map to specific ICD-9 codes

6/24/2010